Targeting Wetland Restoration in the Mississippi Alluvial Valley to Improve Water Quality

Lower Mississippi River Conservation Committee

1. Background information on the LMRCC

2. Ecosystem Change

3. Targeting Wetland Restoration using GIS

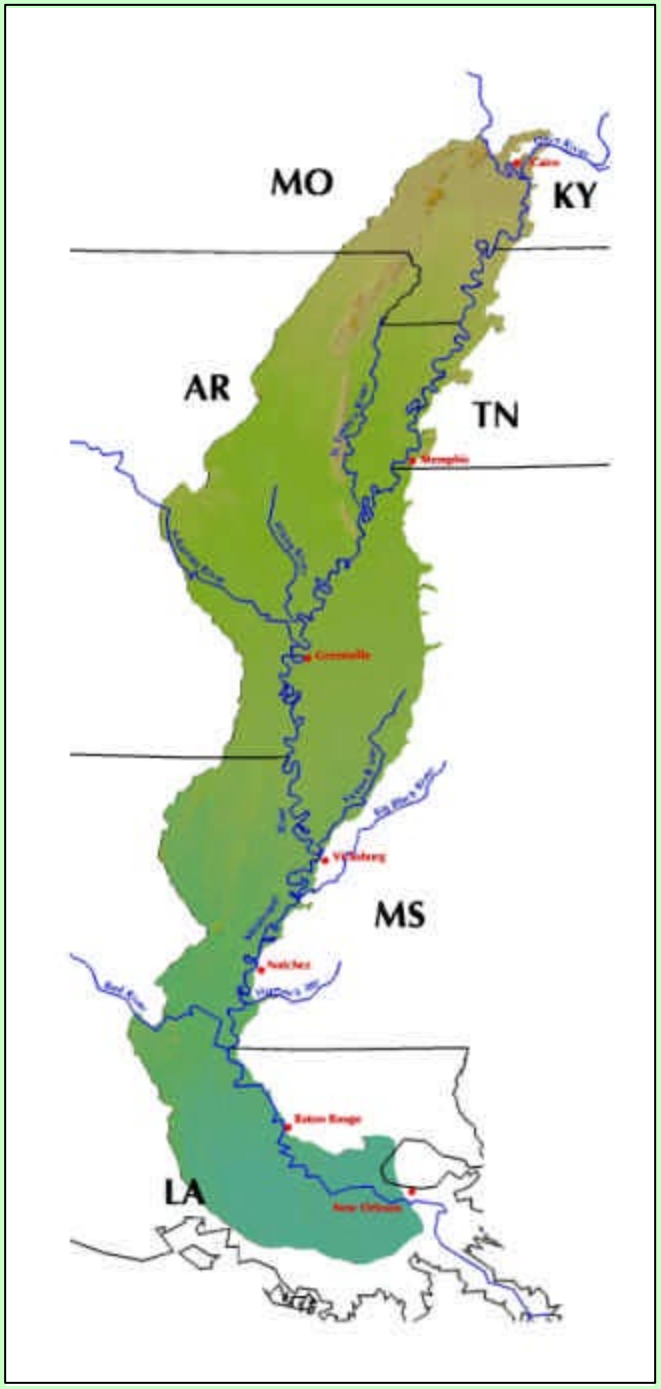
Nonprofit organization comprised of 11 state agencies

MISSOURI LOUISIANA ARKANSAS TENNESSEE

MISSISSIPPI KENTUCKY

Mission

Promote sustainable use of the natural resources of the Lower Mississippi River through cooperative efforts involving planning, management, information sharing, public education, advocacy and research



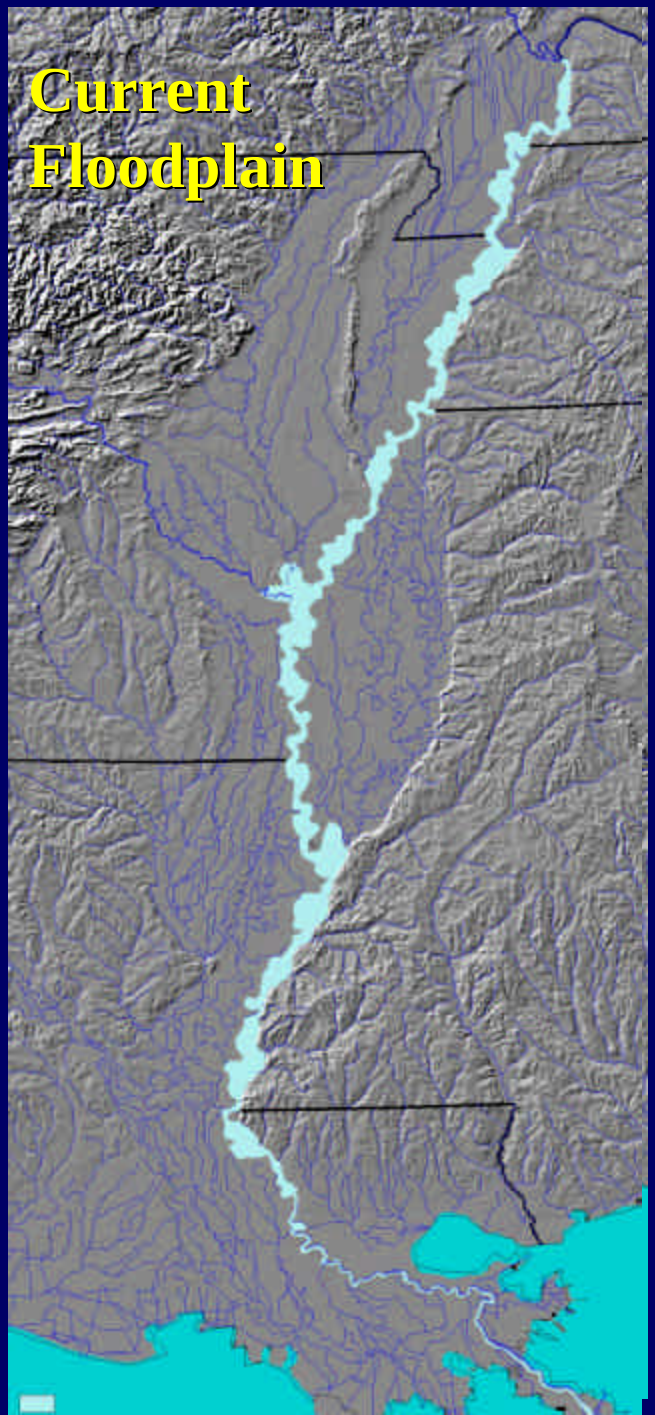
MISSISSIPPI ALLUVIAL VALLEY

22 million acres straddling the Lower Mississippi River.

The Lower Mississippi River flows 954 river miles from its beginning at the confluence with the Ohio River to the Gulf of Mexico

Habitat for 91 freshwater fish species

40% of N.A. waterfowl and 60% of all avian species in the U.S migrate through the Valley



Levees

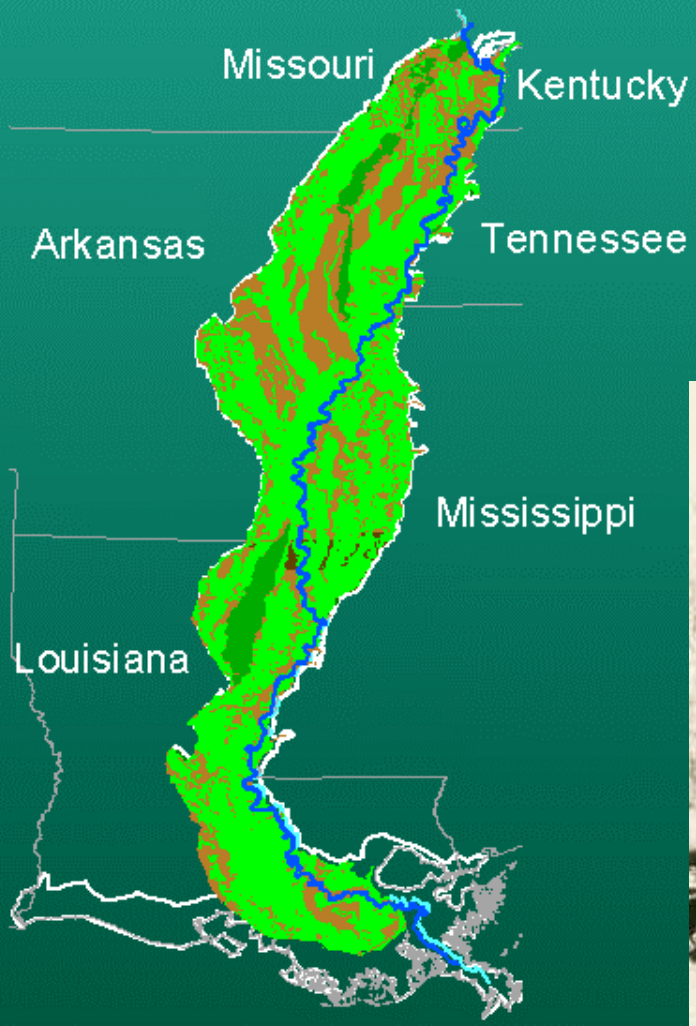
Bank Stabilization

Channelization

Land Clearing

Pre-Settlement

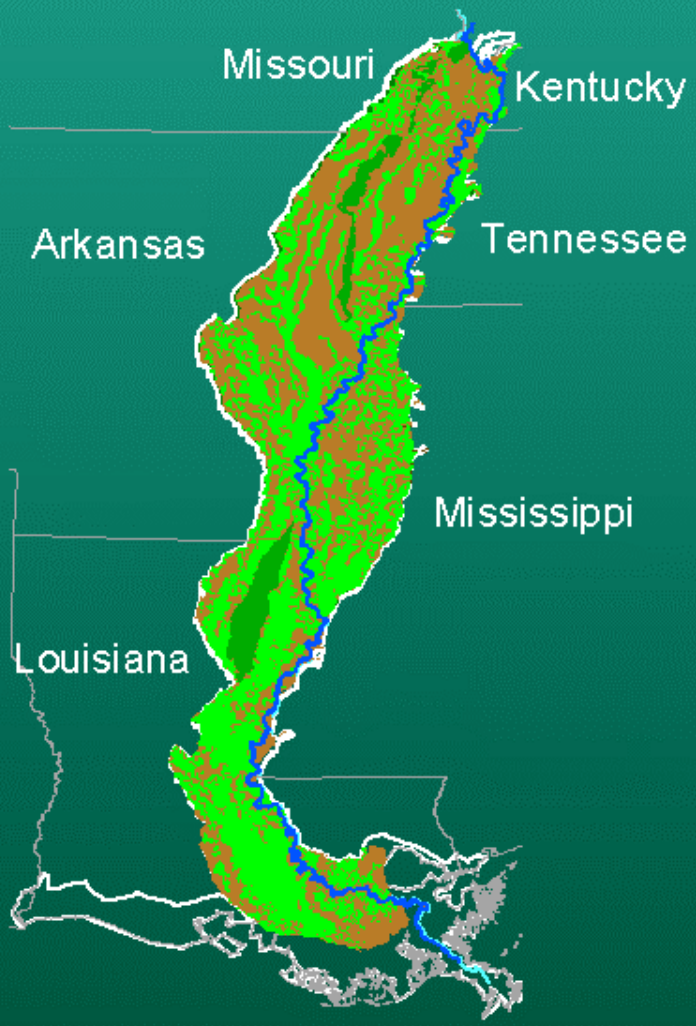
Land Clearing



Pre-Settlement

1900's

Land Clearing

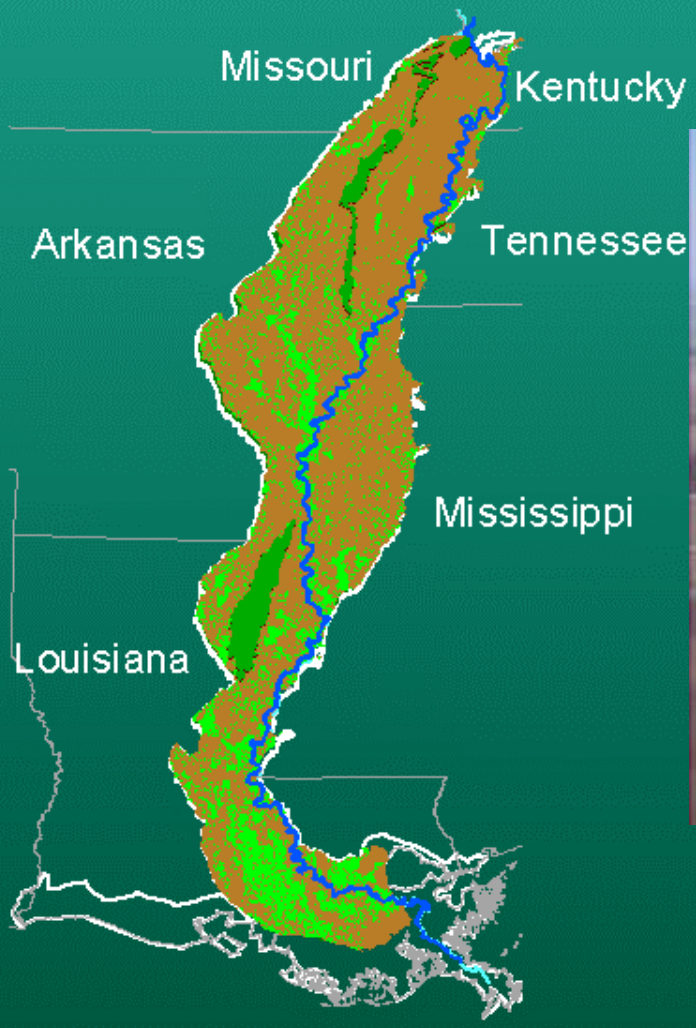


Pre-Settlement

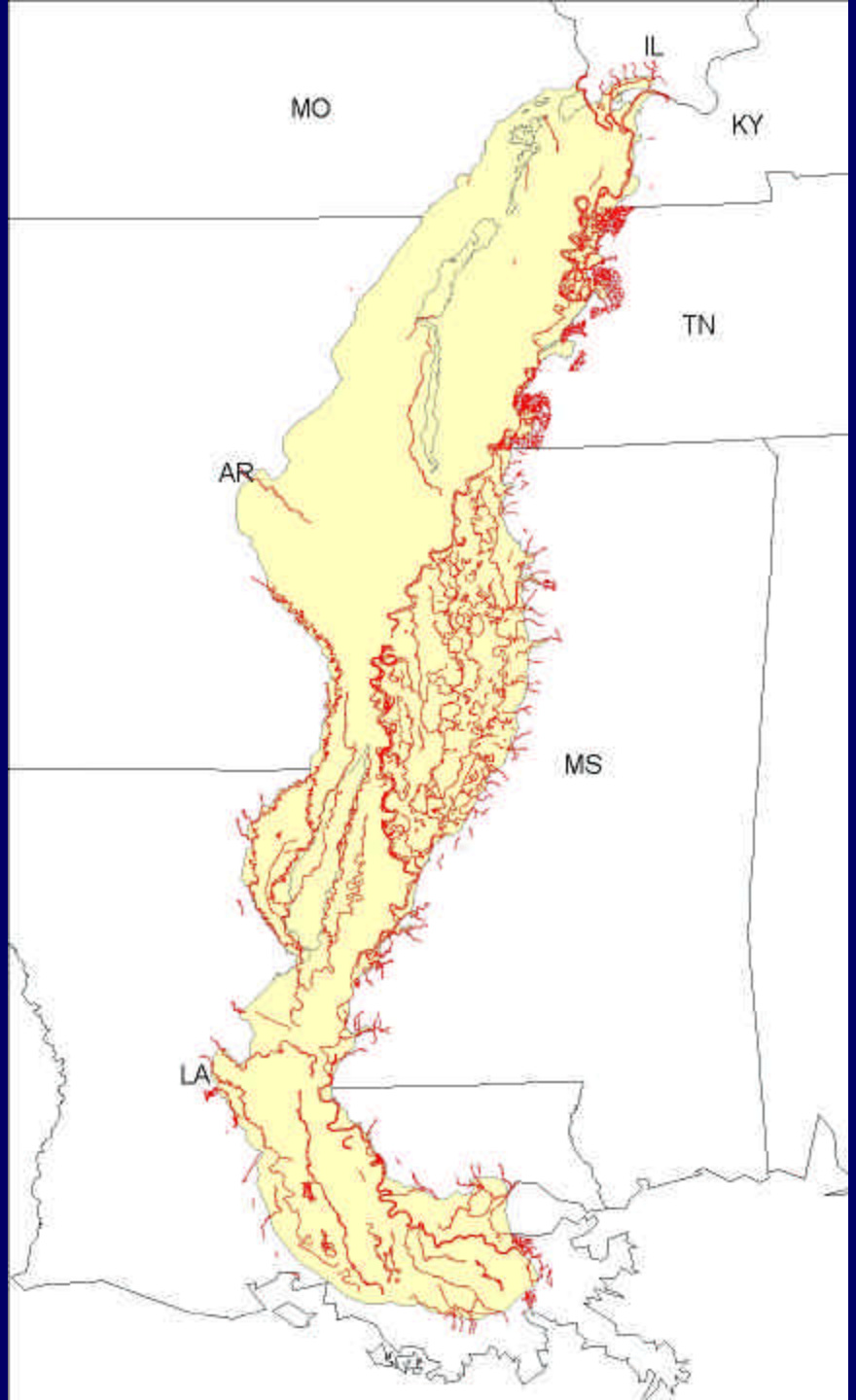
1900's

1950's

Land Clearing

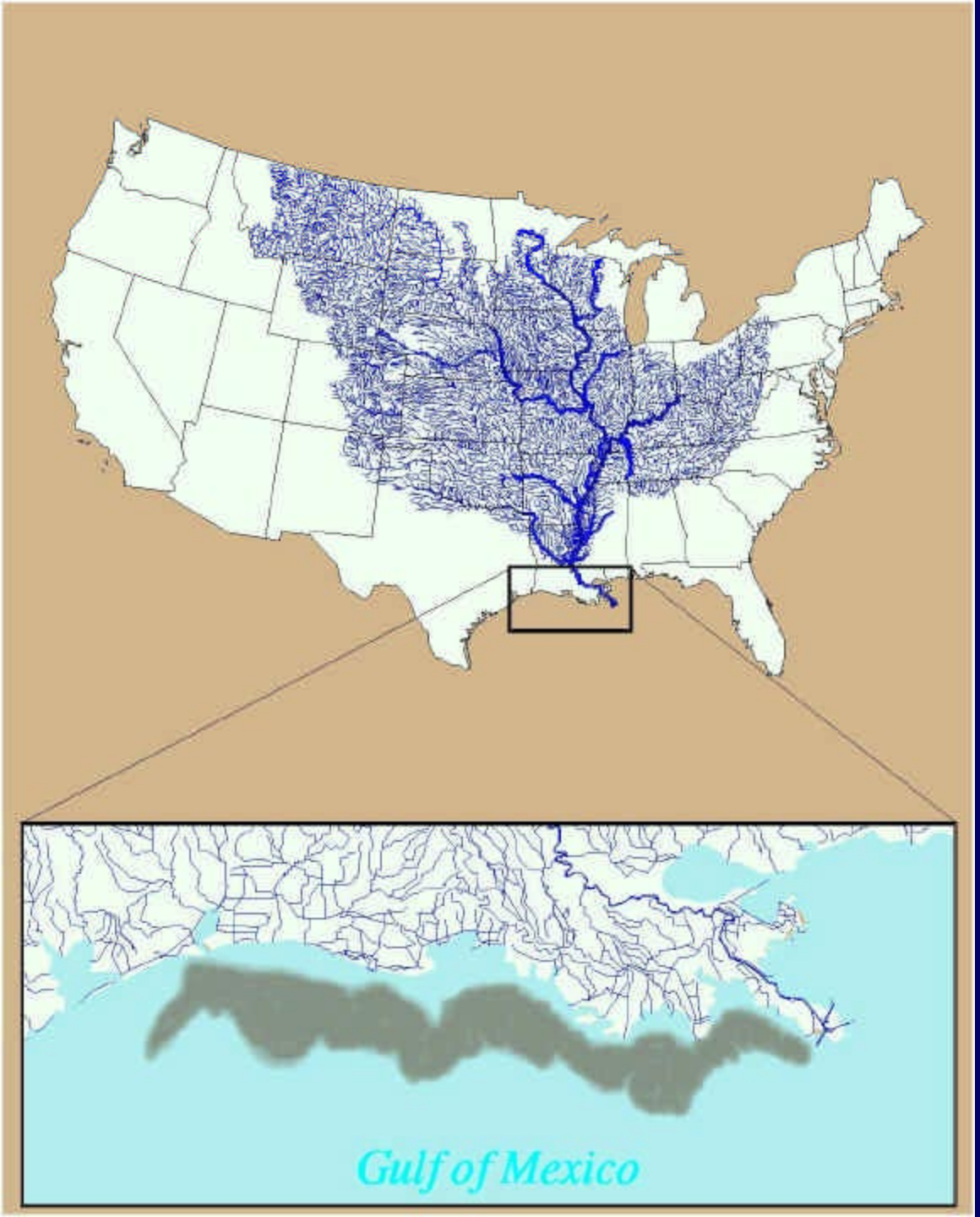


1990s



Impaired Waters

1998 303(d) Impaired/Polluted Waters



Hypoxic Zone

Each summer several thousand square miles of the Gulf of Mexico become depleted of oxygen

Lower Mississippi River
Aquatic Resource Management Plan

GOALS:

- **Restore Aquatic Habitat and Biological Resources**
- **Improve Water Quality**
- **Form Strategic Partnerships**
- **Increase Public Awareness**
- **Promote a Sustainable Economy**

OBJECTIVE: Reforest 130,000 acres of cleared wetlands

WHERE ?

Geographic **I**nformation **S**ystem

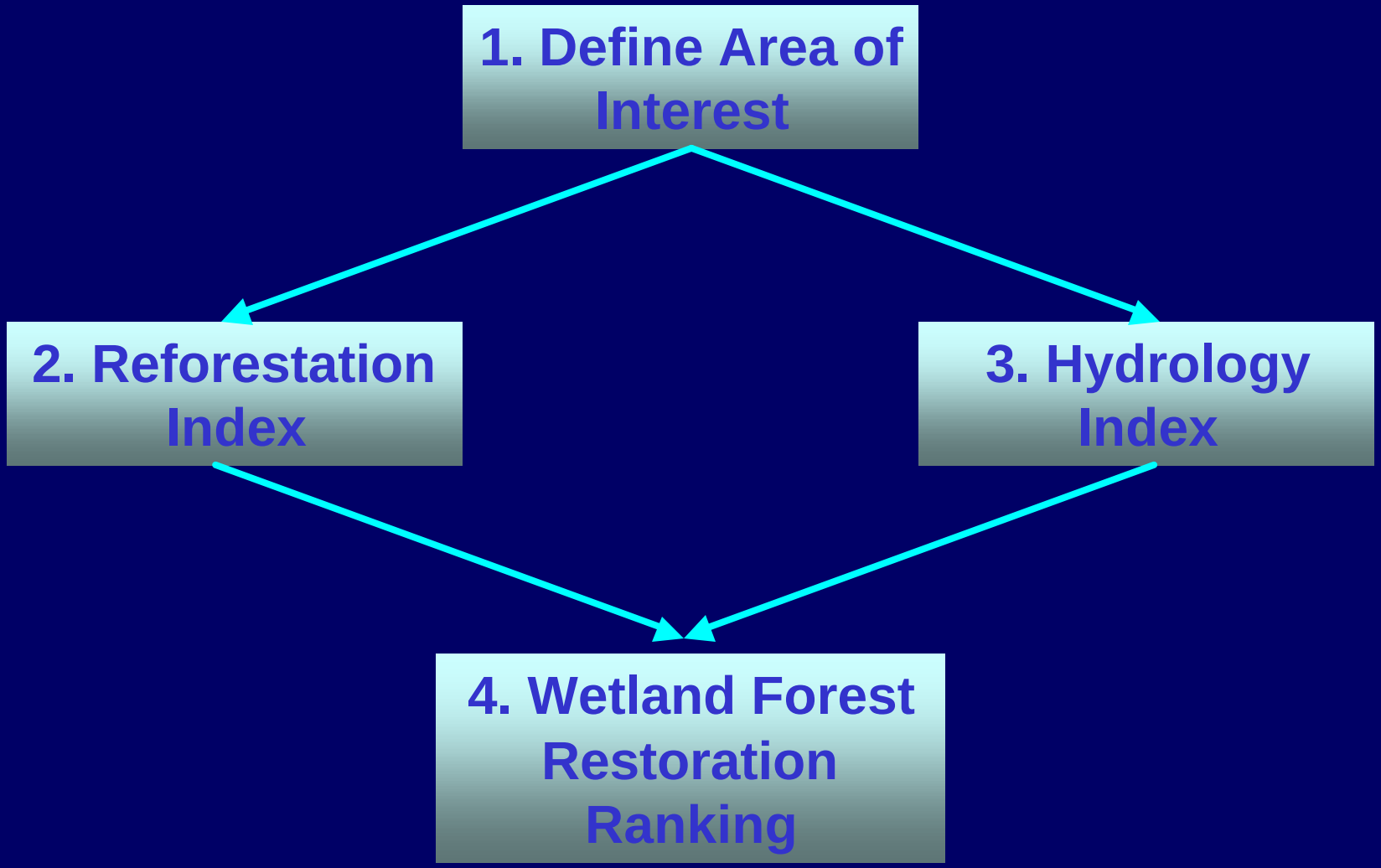
Site Analysis

Prioritize areas across the entire landscape based on:

1. Ability to support a wetland forest

2. Probability of delivering water quality benefits

Model Components/Process Steps

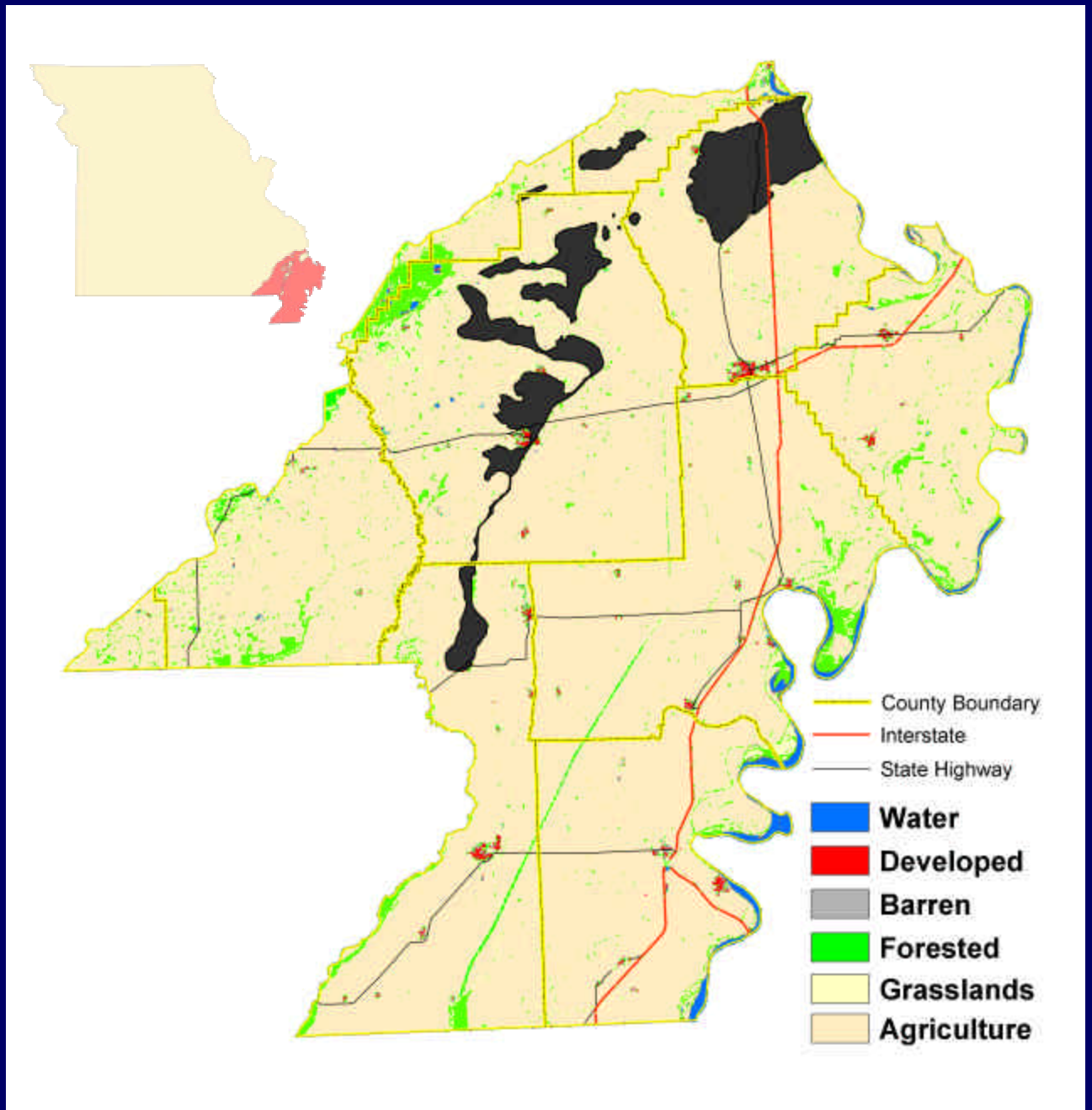


Mississippi Alluvial Valley: Missouri

2.5 million acres

Mostly Agriculture

Net loss of 300,000 acres of forest since 1950s



Process

Software: ESRI ARCINFO GRID and ArcView Spatial Analyst

Data Sources: USDA STATSGO Soils Database, WRP Conservation Easements, USGS DLG, NLCD Landcover, Ducks Unlimited/U.S. Forest Service: Soil Moisture Index, 1999 Forest Cover, EPA: Impaired Waters, USACE: Geomorphology, Various Sources: Public Lands

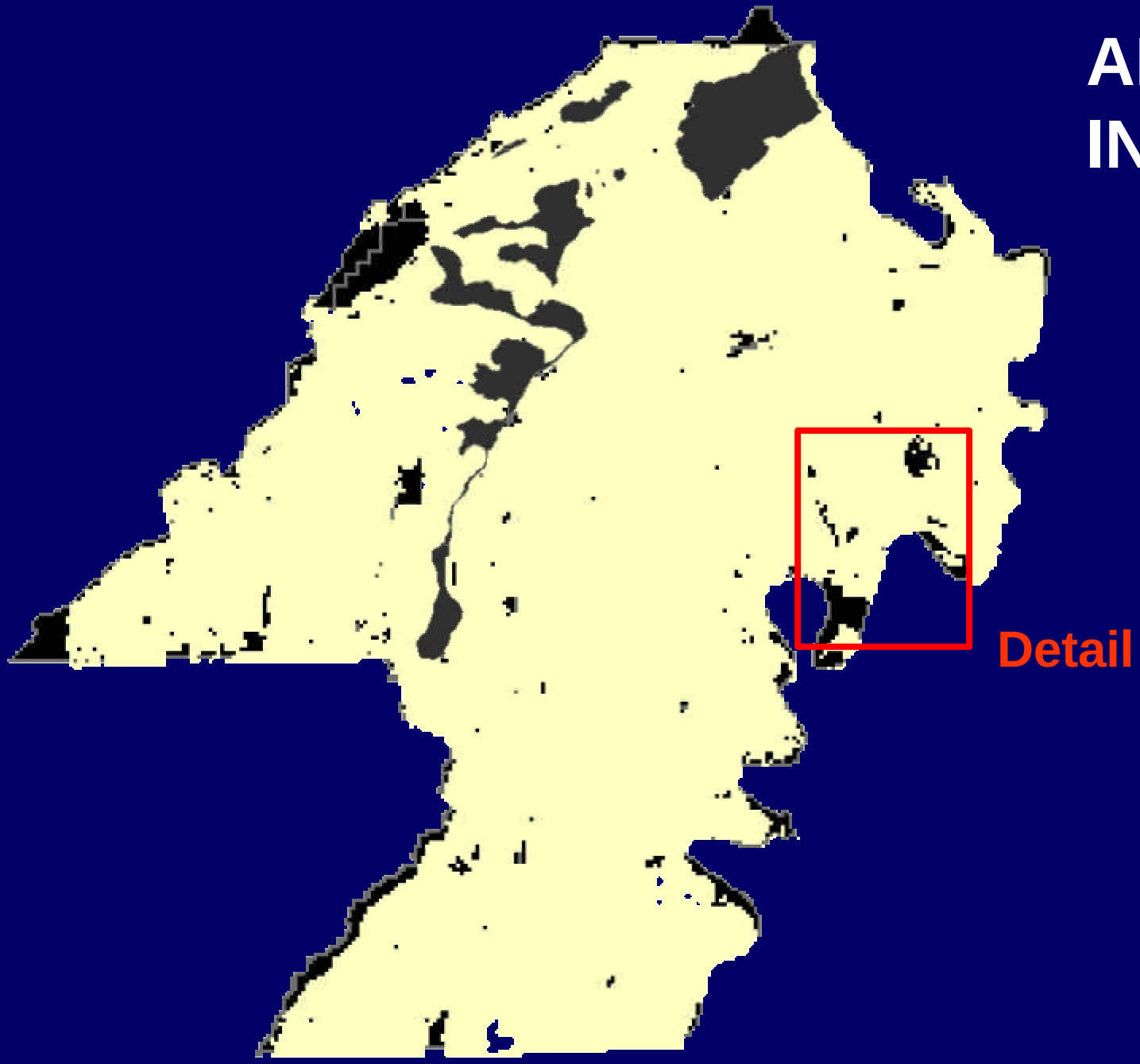
SCALE: 1:12000 to 1:250000

1. Define Area of Interest

Analysis confined to private lands not already forested

Areas Excluded:

- **Public Lands**
- **Water surfaces**
- **Developed Areas**
- **Conservation Easements**
- **Forest**


AREA of
INTEREST
Detail

AREA of INTEREST

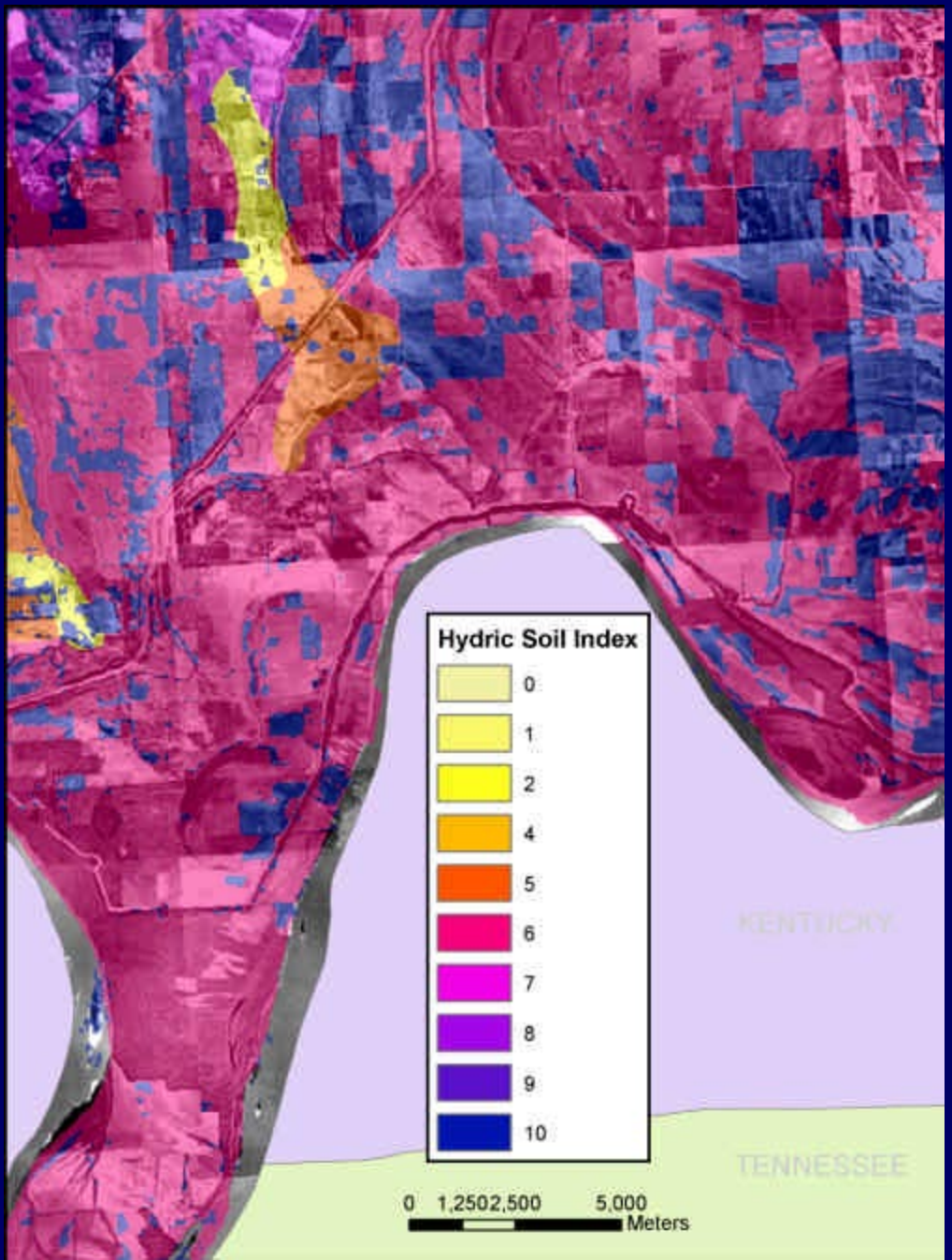
2. Reforestation Index

Compile factors that indicate a site's ability to sustain a wetland forest

Components

- **Soil Moisture**
- **Seed Source**
- **Geomorphology**

Soil Moisture

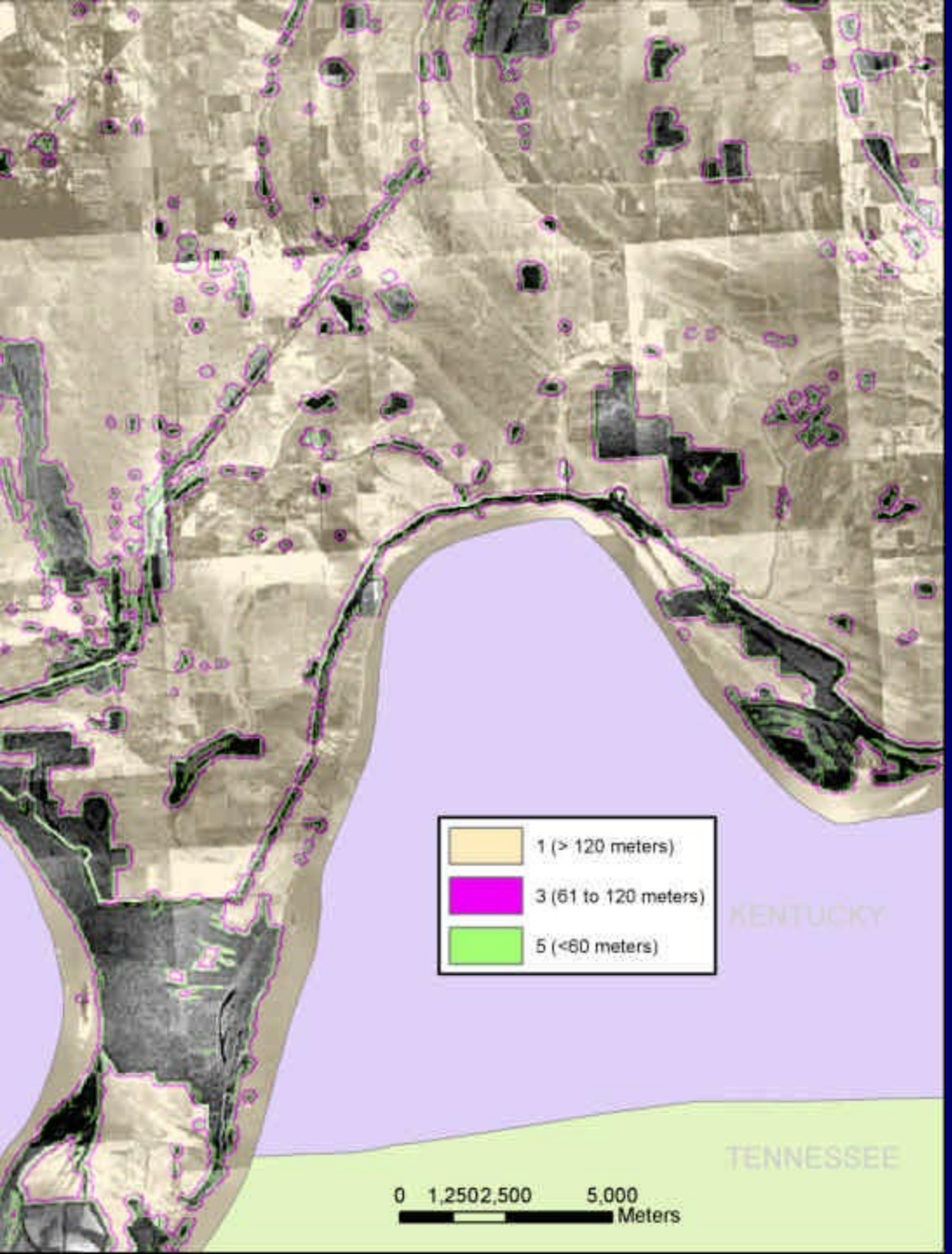


Probability of Hydric Soils

Hydric Soils (STATSGO)

Soil Moisture Index (Ducks Unlimited)

Seed Source

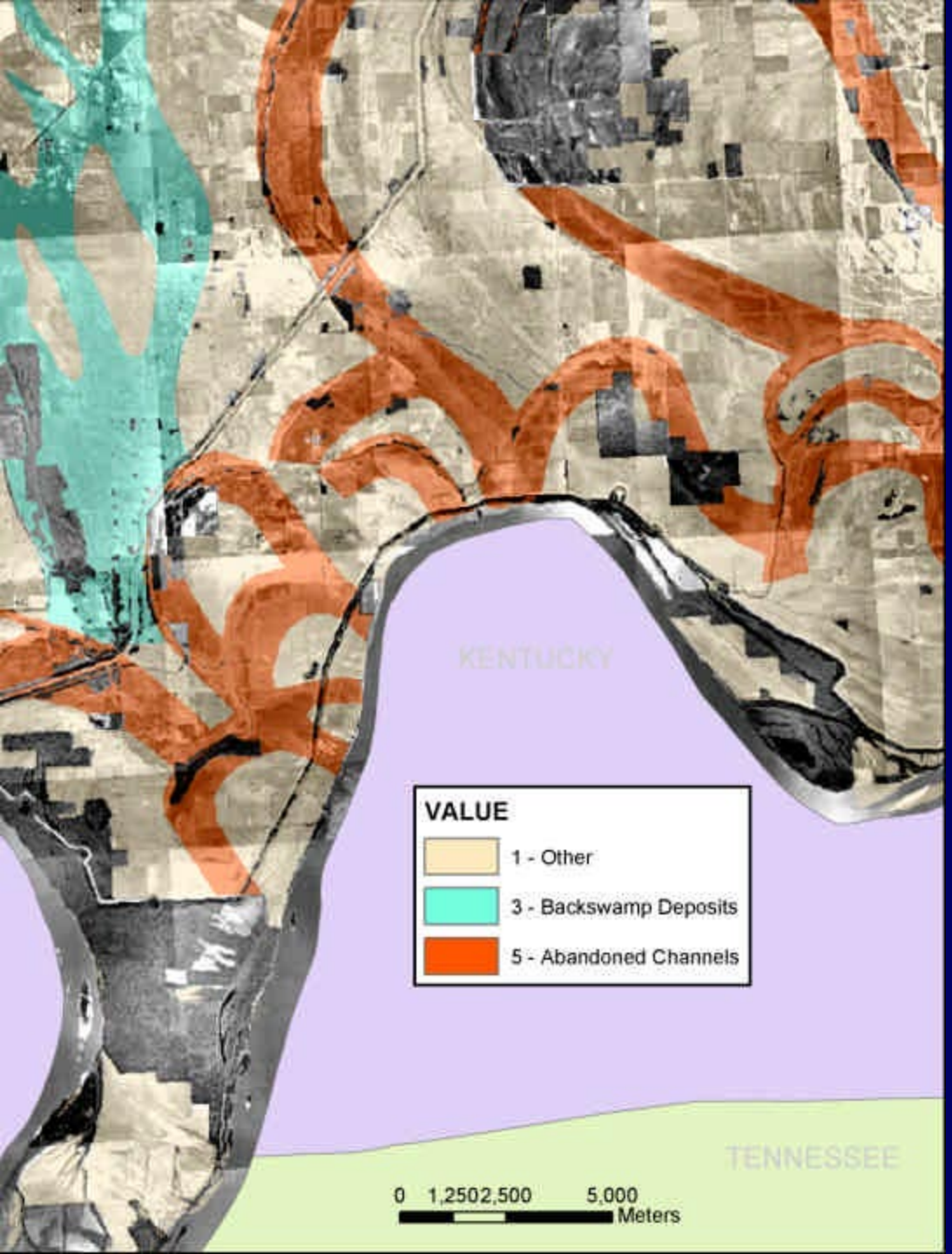


Indicator of biodiversity

Weights:

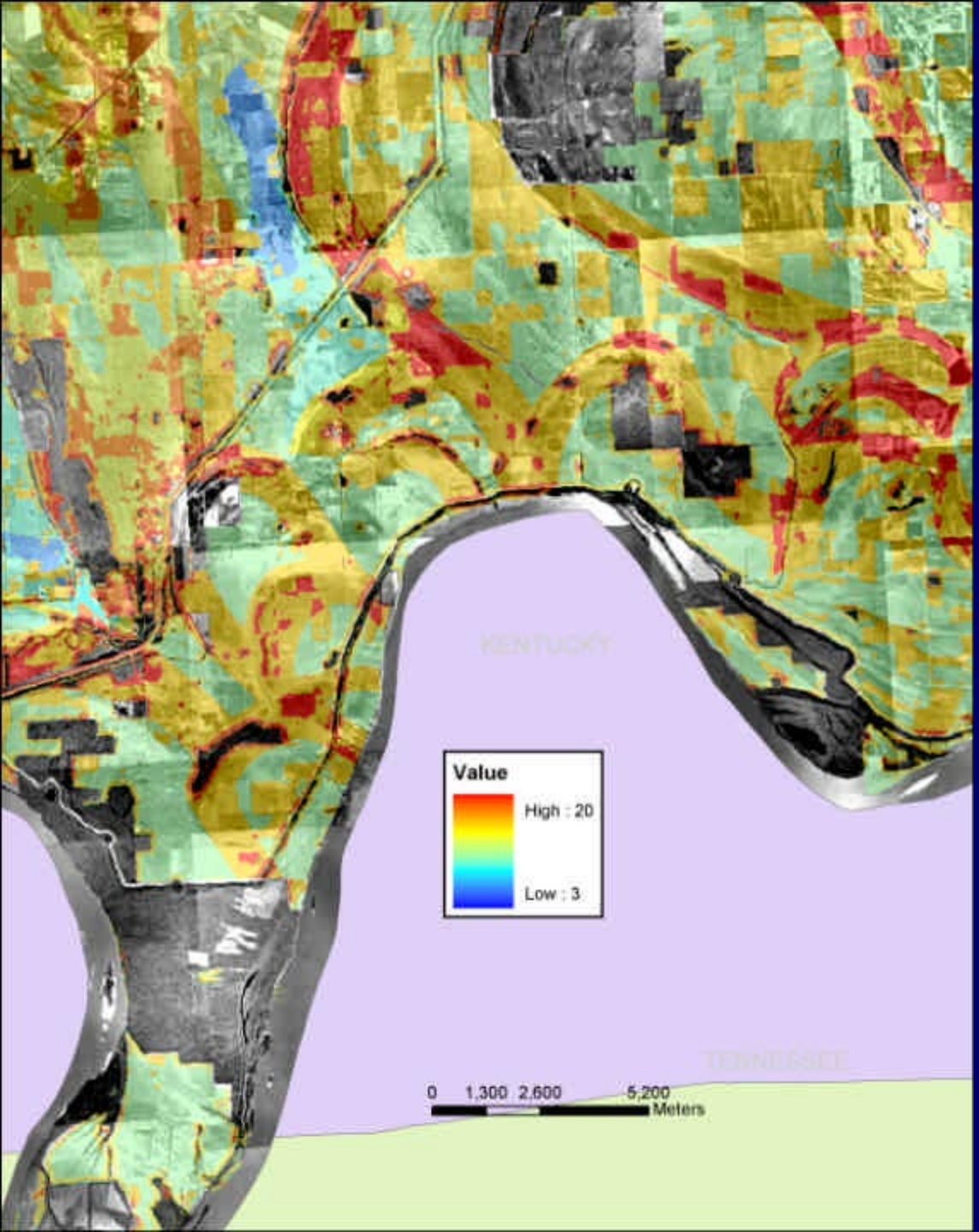
> 120 meters	1
60 to 120 meters	3
< 60 meters	5

Geomorphology



Landforms suggest frequency and duration of inundation

2. Reforestation Index

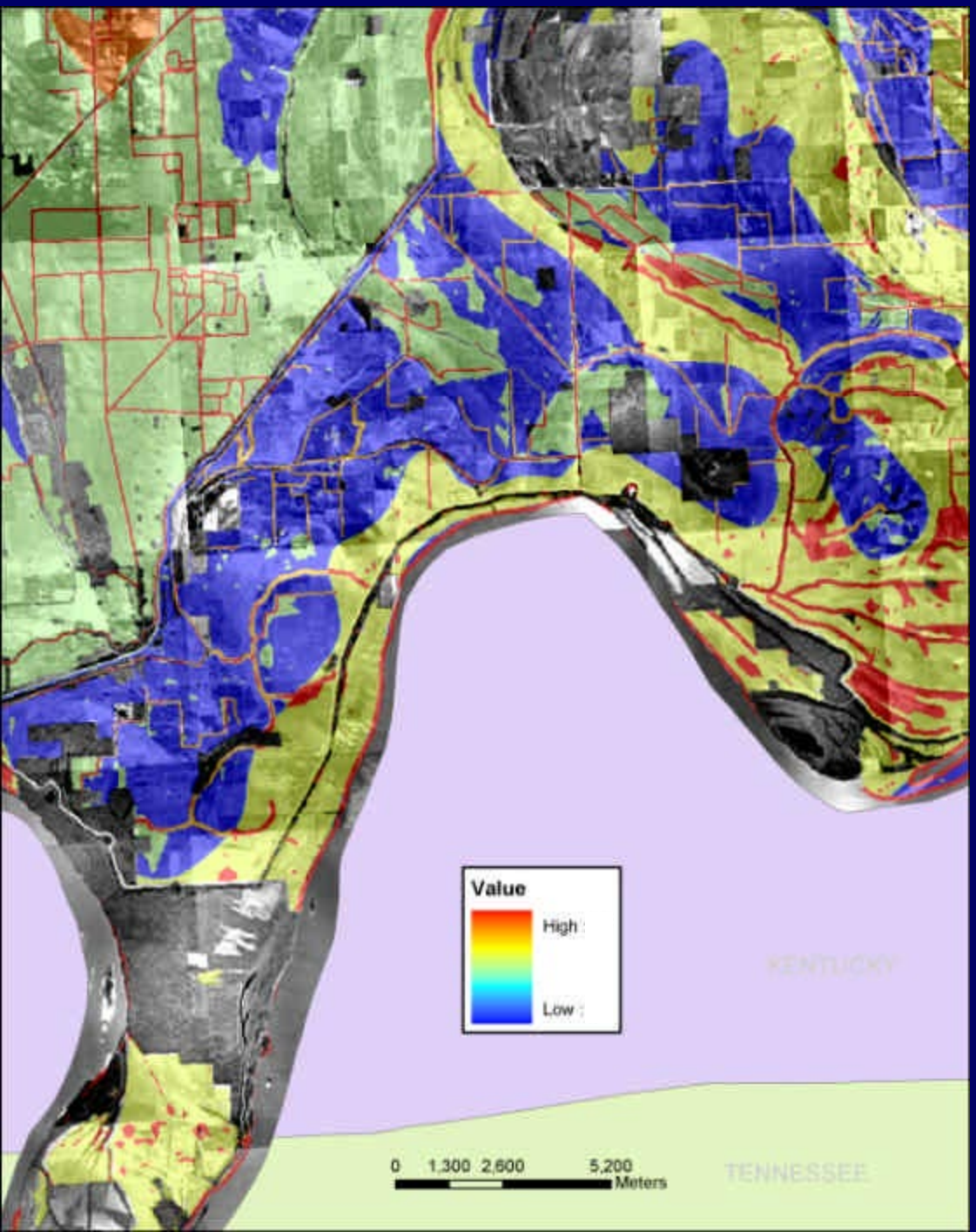


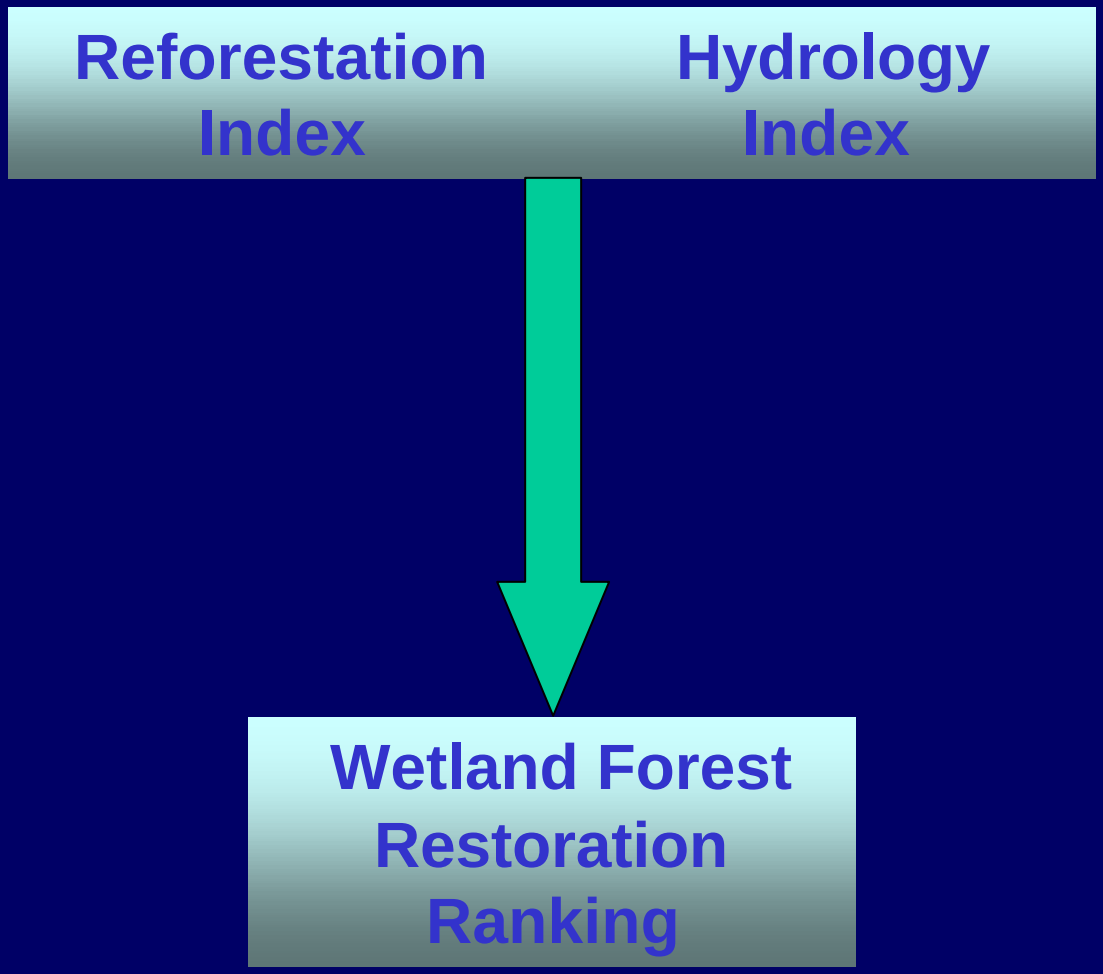
3. Hydrology Index

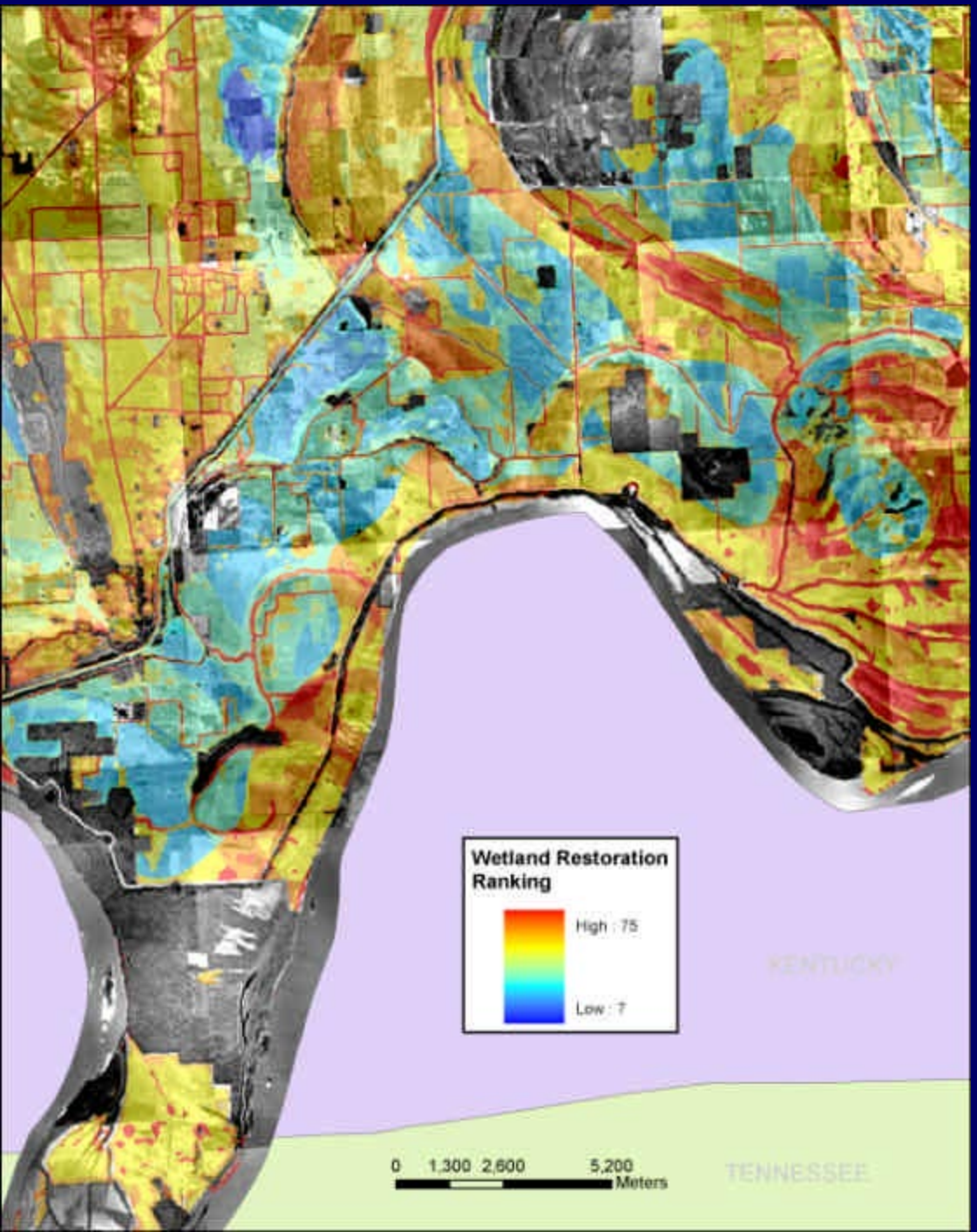
Identify areas on the landscape that will likely trap sediment, reduce nutrient and pesticide runoff

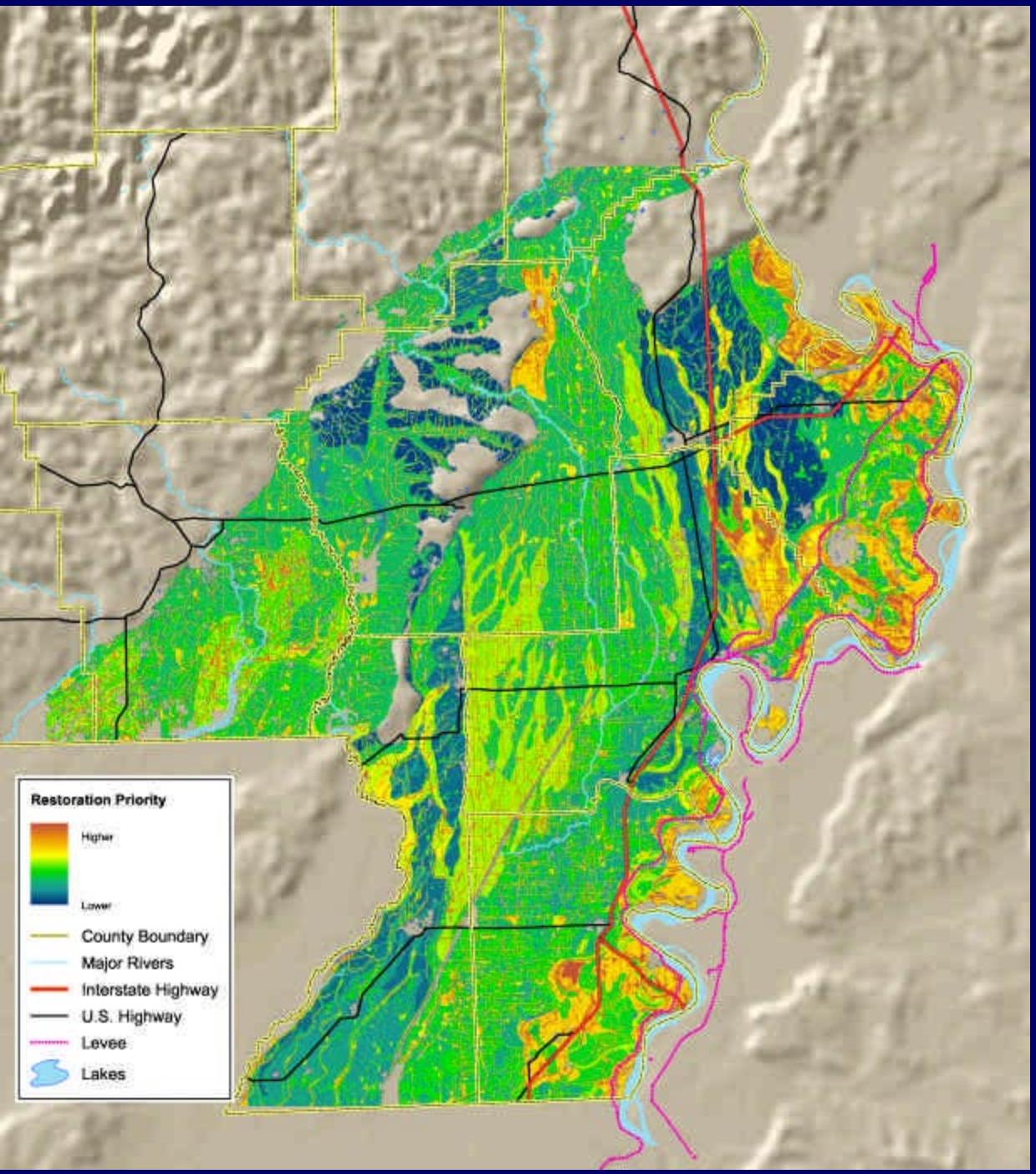
- Proximity to Watercourses
- Flooding Frequency
- Flooding Duration
- Proximity to Impaired Waters
- Topographical Depressions

3. Hydrology Index




Reforestation Index
Hydrology Index
Wetland Forest Restoration Ranking


Wetland Restoration Ranking
High : 75
Low : 7
KENTUCKY
TENNESSEE
0 1,300 2,600 5,200
Meters



SUMMARY

What it is…

Landscape level planning tool to support decision making

A method to estimate potential water quality benefits

What it is not…

Site Specific Planning Tool